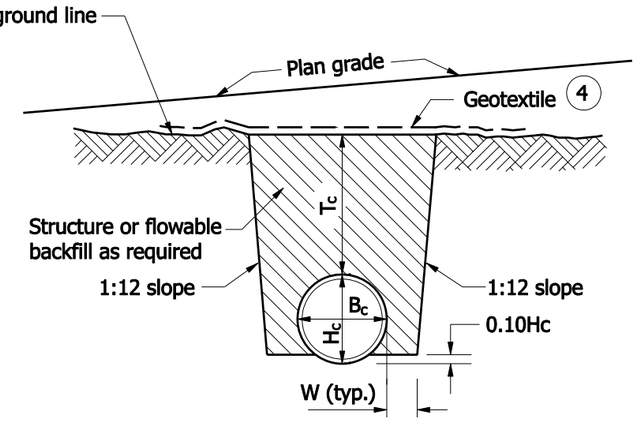



SECTION A-A

LEGEND

$H_c$ = Overall diameter or rise (typ.)

$B_c$ = Overall diameter or span

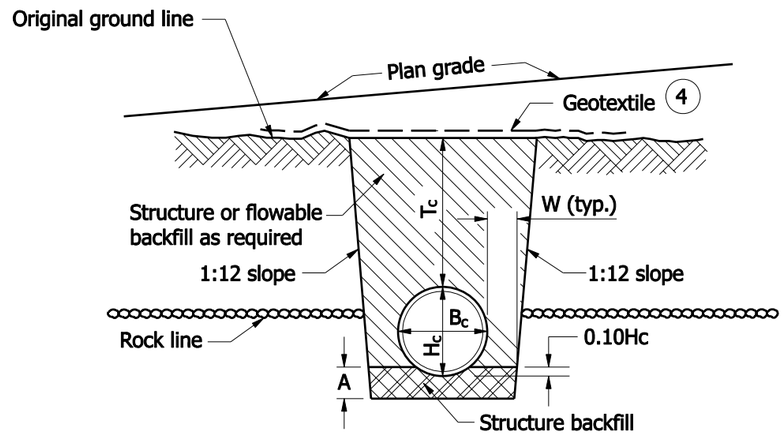
A = 8" min. for fill height less than 16'
= 12" min. for fill height of 16' or more

$T_c$ = Trench cover depth over pipe

W = 0.3 $B_c$ or 9", whichever is greater

E = Encasement

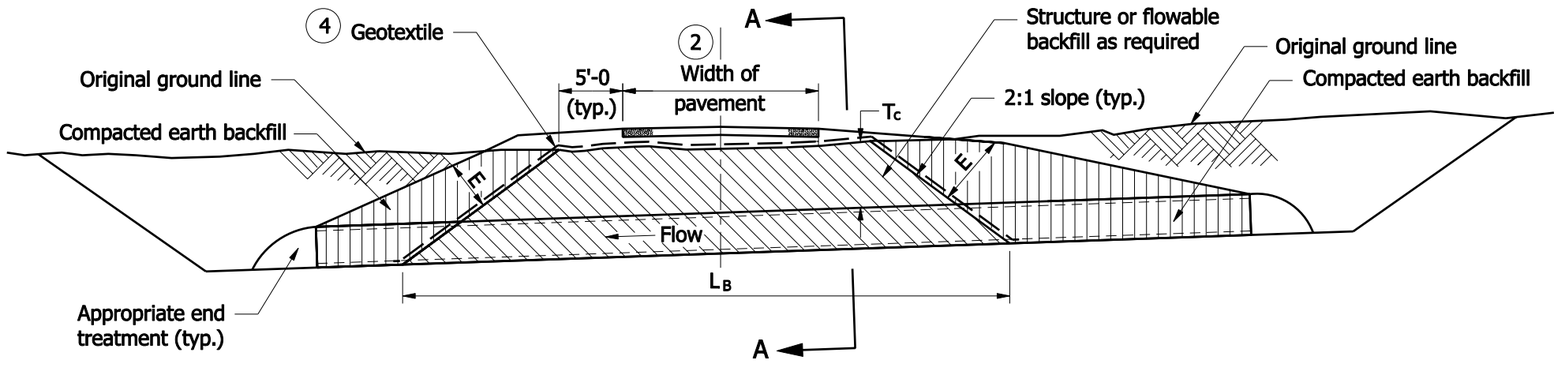
$L_B$ = Backfill length measured from toe to toe of the 2:1 slopes.




SECTION A-A
ROCK FOUNDATION

NOTES :

1. Protective cover shall be constructed prior to running heavy equipment over installed pipes. The minimum covers are listed below:
   a.) 1.5' for $B_c \leq 18"$
   b.) 3' for $18" < B_c \leq 54"$
   c.) 4' for $B_c > 54"$
2. For backfill purposes, paved shoulders, curbs, and sidewalks are considered pavement. See Standard Drawing E 715-BKFL-10 for pavement limits when curbs, paved shoulders, or sidewalks are present.
3. Flowable or structure backfill shall be encased by compacted earth backfill. The minimum encasement shall be 2 ft. If necessary, the 2:1 slope between the flowable or structure backfill and the encasement shall be modified to maintain the minimum 2 ft encasement.
4. Geotextile required if coarse aggregate is used. Geotextile should extend 1 foot beyond each edge of the excavated trench or toe of slope.



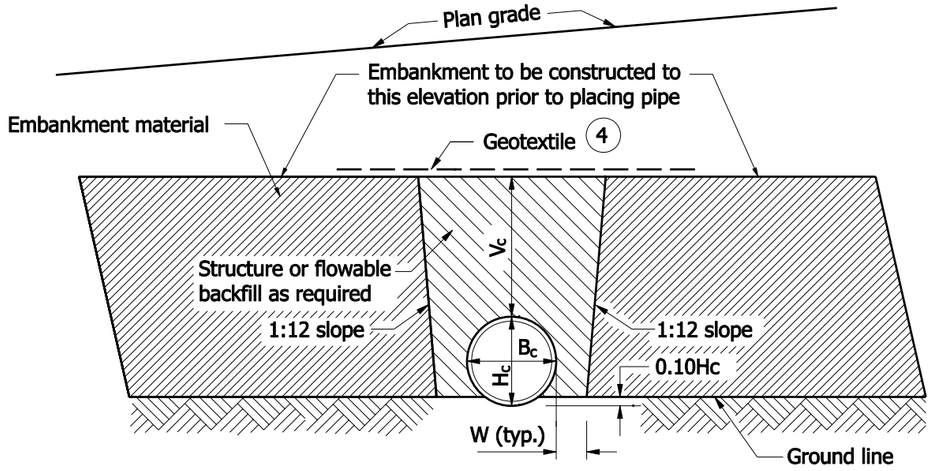

ELEVATION

INDIANA DEPARTMENT OF TRANSPORTATION

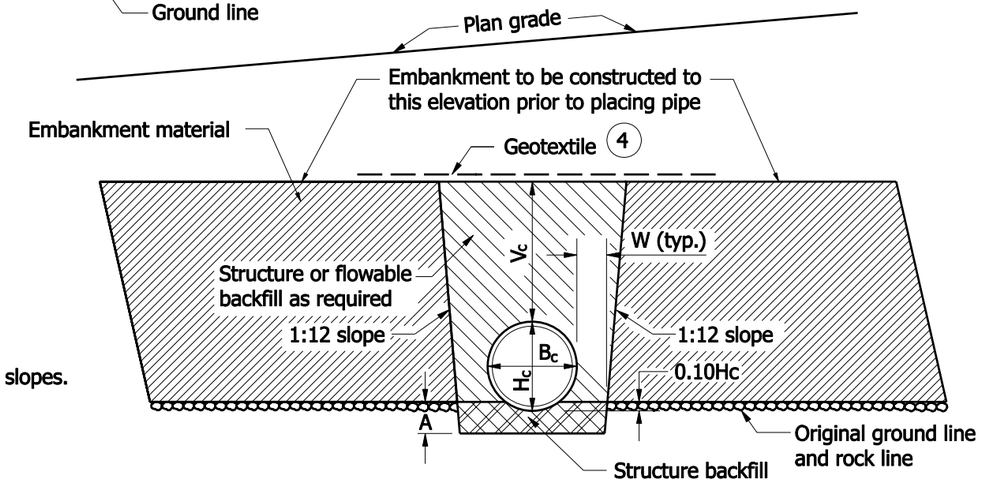
PIPE BACKFILL METHOD 1
NEW ROADWAY, TRENCH

E 715-R-536d 1 of 10

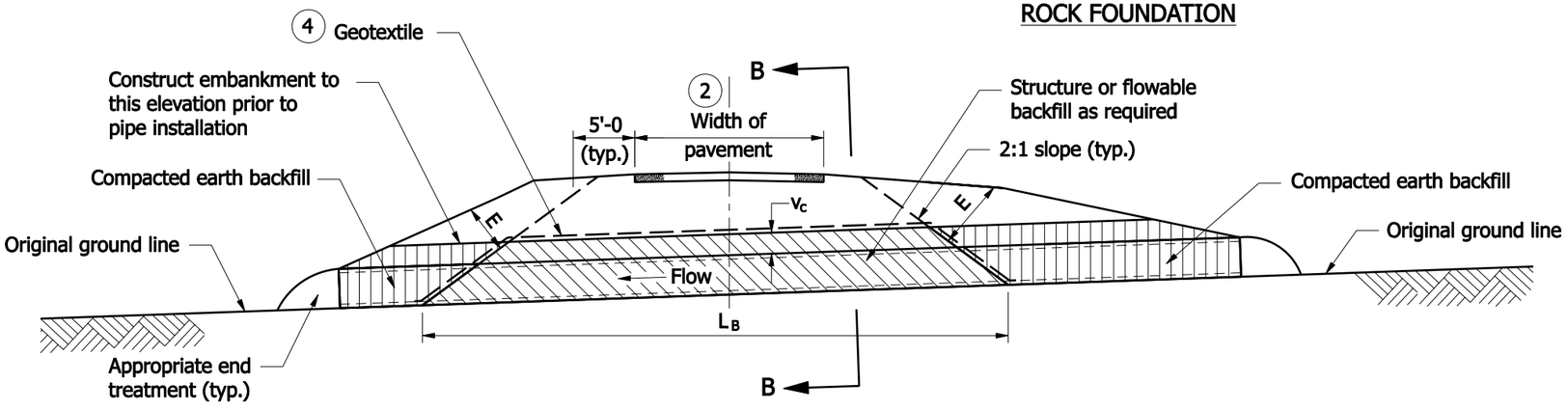
11-16-06




SECTION B-B




SECTION B-B
ROCK FOUNDATION




ELEVATION

## LEGEND

$H_c$ = Overall diameter or rise (typ.)

$B_c$ = Overall diameter or span

A = 8" min. for fill height less than 16'
= 12" min. for fill height of 16' or more

$V_c$ = 12" for $B_c \leq 18$"
18" for $B_c > 18$"

W = 0.3 $B_c$ or 9", whichever is greater

$L_B$ = Backfill length measured from toe to toe of the 2:1 slopes.

## NOTES :

1. Protective cover shall be constructed prior to running heavy equipment over installed pipes. The minimum covers are listed below:
   a.) 1.5' for $B_c \leq 18$"
   b.) 3' for 18" < $B_c \leq 54$"
   c.) 4' for $B_c > 54$"
2. For backfill purposes, paved shoulders, curbs, and sidewalks are considered pavement. See Standard Drawing E 715-BKFL-10 for pavement limits when curbs, paved shoulders, or sidewalks are present.
3. Flowable or structure backfill shall be encased by compacted earth backfill. The minimum encasement shall be 2 ft. If necessary, the 2:1 slope between the flowable or structure backfill and the encasement shall be modified to maintain the minimum 2 ft encasement.
4. Geotextile required if coarse aggregate is used. Geotextile should extend 1 foot beyond each edge of the excavated trench or toe of slope.

INDIANA DEPARTMENT OF TRANSPORTATION

# PIPE BACKFILL METHOD 1
# NEW ROADWAY, EMBANKMENT

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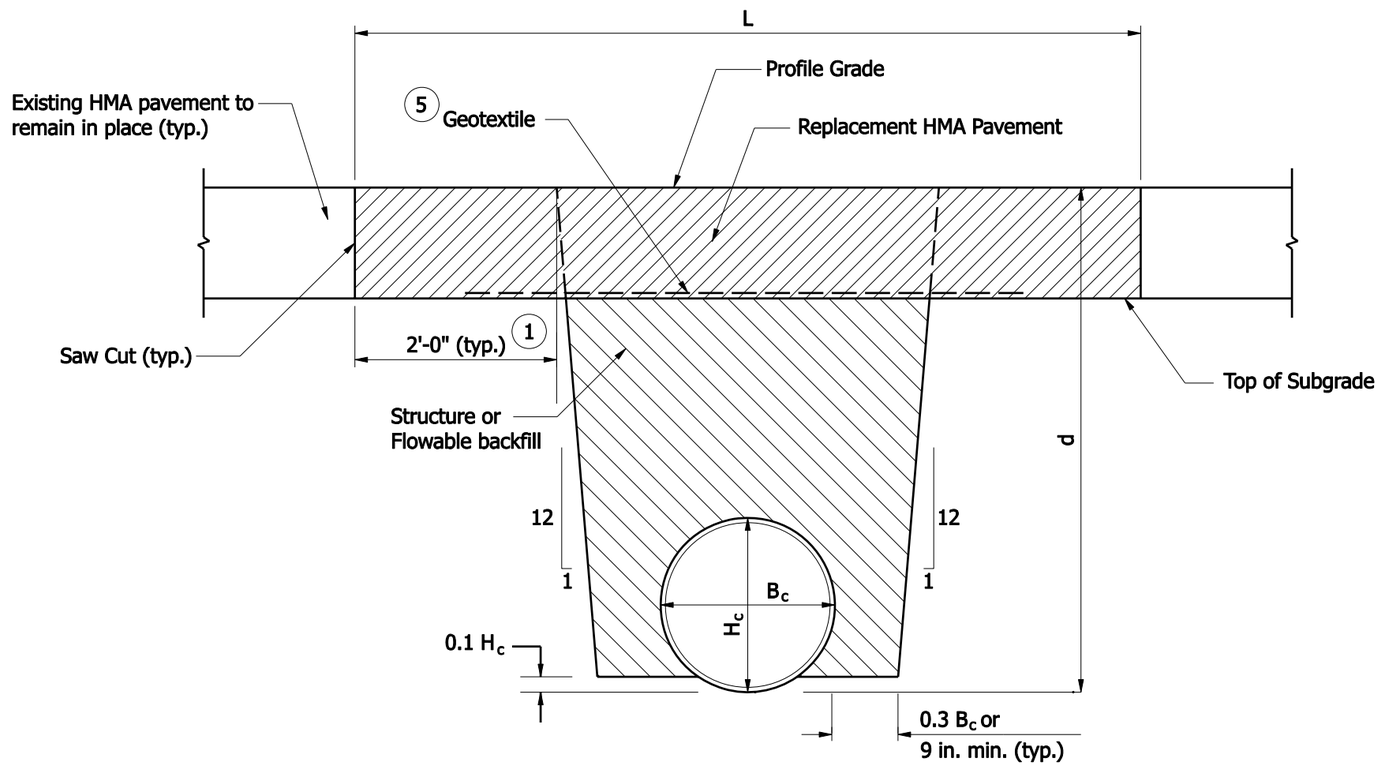


L = Pay limits of pavement removal and pavement replacement (ft); for cross pipe, measured along roadway centerline; for pipe parallel to roadway centerline, measured prependicular to pipe centerline.

$B_C$ = Overall diameter or span (in.)

$H_C$ = Overall diameter or rise (in.)

d = Vertical distance from flowline to profile grade (ft)

HMA REPLACEMENT PAVEMENT

NOTES :

1. Existing subgrade over this distance shall remain in place.
2. The minimum pavement sections shall be as follows:
   HMA: 165 #/syd HMA Surface, Type A,B,C or D on
   variable HMA Intermediate, Type A, B, C or D
3. If underdrains are present, they shall be perpetuated in accordance with the details shown on Standared Drawing E 718-UNDR-01.
4. See Standard Drawing E 715-BKFL-01 for pipe backfill trench elevation view.
5. Geotextile required if coarse aggregate is used. Geotextile should extend 1 foot beyond each edge of the excavated trench.

INDIANA DEPARTMENT OF TRANSPORTATION

# PIPE BACKFILL METHOD 1
# EXISTING ROADWAY, TRENCH

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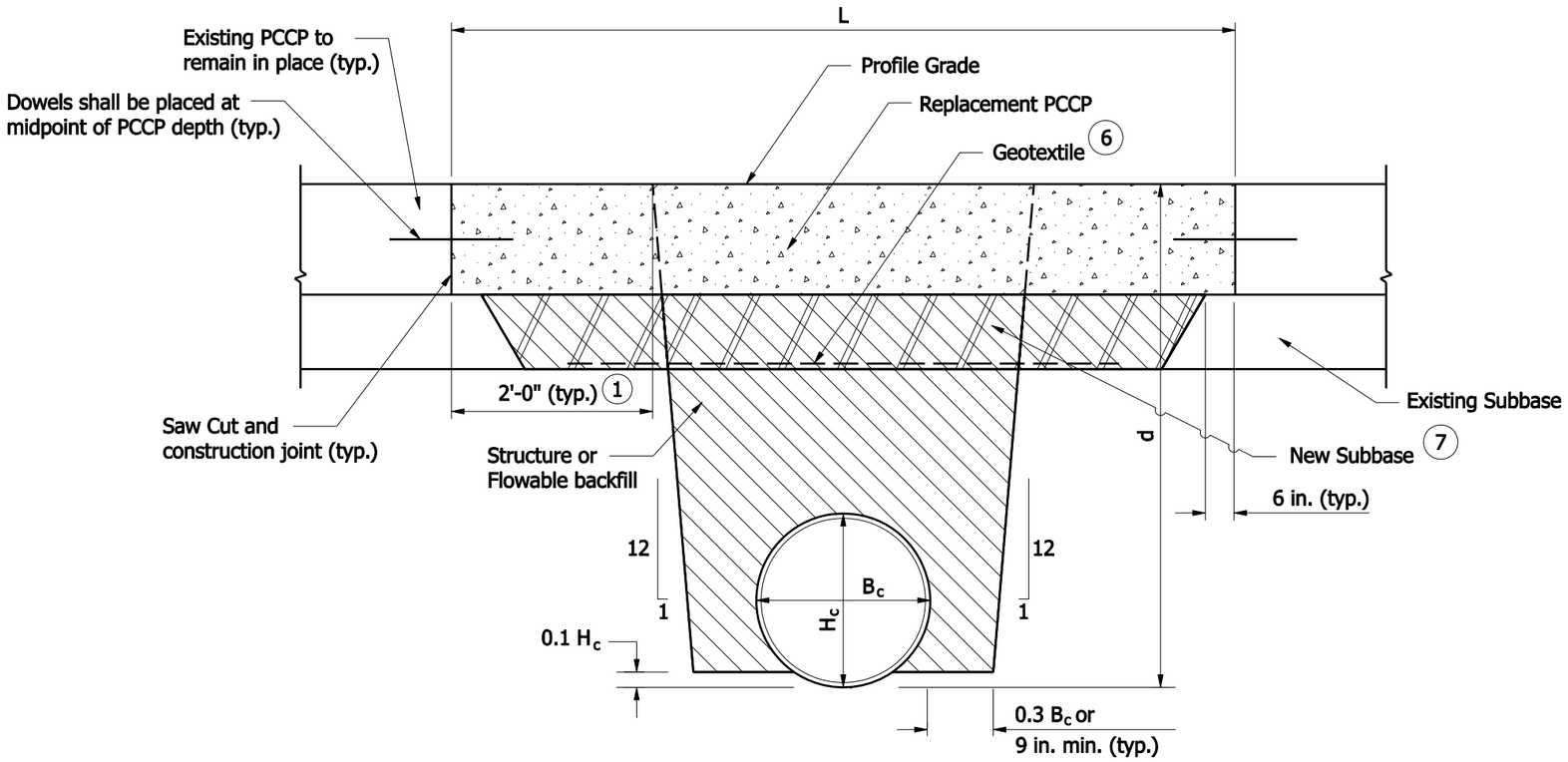


L = Pay limits of pavement removal and pavement replacement (ft); for cross pipe, measured along roadway centerline; for pipe parallel to roadway centerline, measured prependicular to pipe centerline.

$B_C$ = Overall diameter or span (in.)

$H_C$ = Overall diameter or rise (in.)

d = Vertical distance from flowline to profile grade (ft)

PCCP REPLACEMENT PAVEMENT

NOTES :

1. Existing subgrade over this longitudinal distance shall remain in place.
2. The thickness of the replacement PCCP shall match that of the existing concrete pavement.
3. See Standard Drawing E 506-CCPP-01 for subbase, dowels, and construction joint details.
4. If underdrains are present, they shall be perpetuated in accordance with the details shown on Standard Drawing E 718-UNDR-01.
5. See Standard Drawing E 715-BKFL-01 for pipe backfill trench elevation view.
6. Geotextile required if coarse aggregate is used. Geotextile should extend 1 foot beyond each edge of the excavated trench.
7. New subbase type shall match the existing subbase type and thickness.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL, METHOD 1
EXISTING ROADWAY, TRENCH

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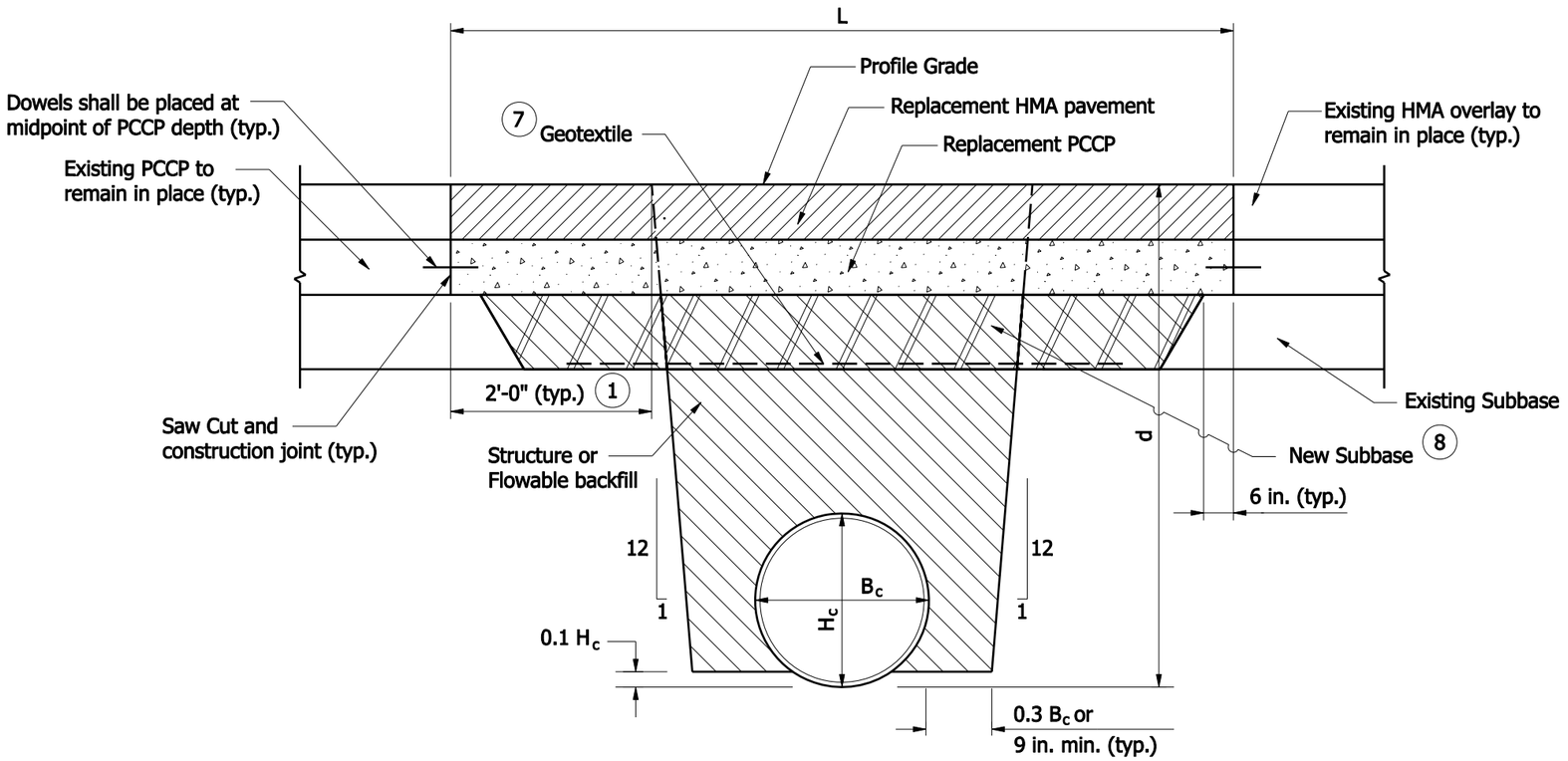


NOTES :

1. Existing subgrade over this distance shall remain in place.
2. The thickness of the replacement PCCP shall match that of the existing concrete pavement.
3. The minimum pavement sections shall be as follows:
   HMA: 165 #/syd HMA Surface, Type A,B,C or D on
   variable HMA Intermediate, Type A, B, C or D
4. See Standard Drawing E 506-CCPP-01 for subbase, dowels, and construction joint details.
5. If underdrains are present, they shall be perpetuated in accordance with the details shown on Standard Drawing E 718-UNDR-01.
6. See Standard Drawing E 715-BKFL-01 for pipe backfill trench elevation view.
7. Geotextile required if coarse aggregate is used. Geotextile should extend 1 foot beyond each edge of the excavated trench.
8. New subbase type shall match the existing subbase type and thickness.

L = Pay limits of pavement removal and pavement replacement (ft); for cross pipe, measured along roadway centerline; for pipe parallel to roadway centerline, measured prependicular to pipe centerline.

$B_C$ = Overall diameter or span (in.)

$H_C$ = Overall diameter or rise (in.)

d = Vertical distance from flowline to profile grade (ft)

COMPOSITE REPLACEMENT PAVEMENT

INDIANA DEPARTMENT OF TRANSPORTATION

# PIPE BACKFILL METHOD 1
# EXISTING ROADWAY, TRENCH

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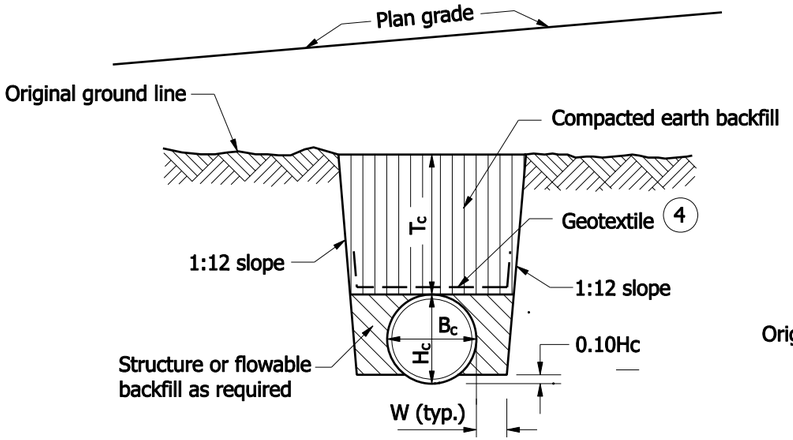
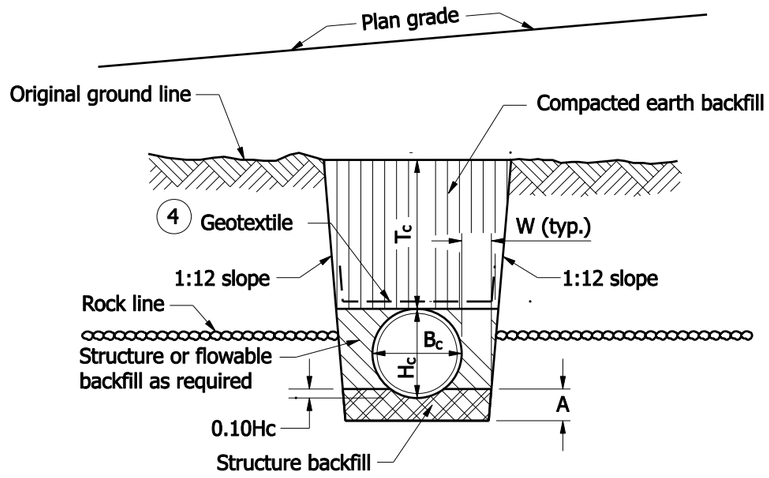


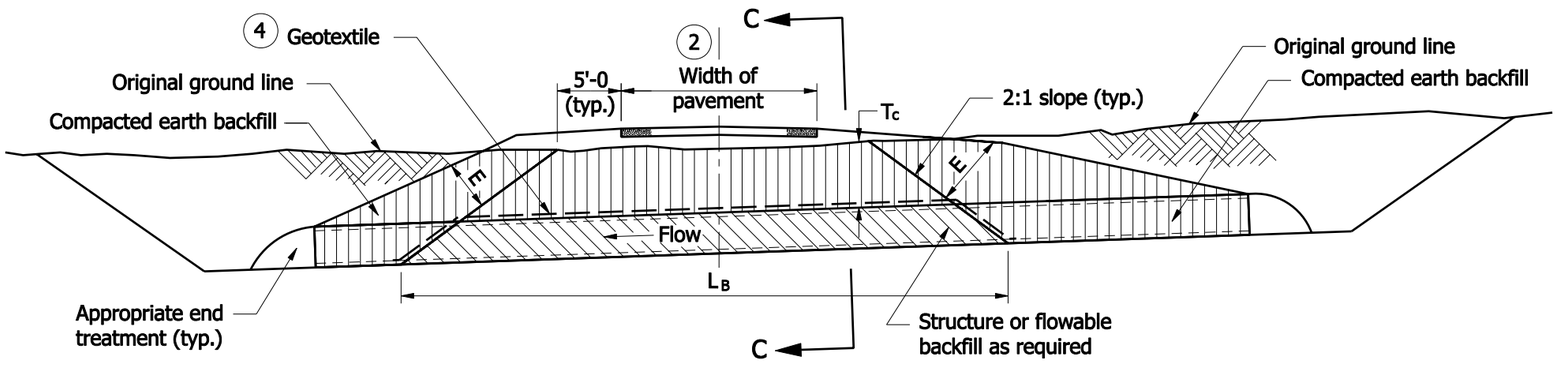

SECTION C-C




SECTION C-C
ROCK FOUNDATION

## LEGEND

$H_c$ = Overall diameter or rise (typ.)
$B_c$ = Overall diameter or span
A = 8" min. for fill height less than 16'
= 12" min. for fill height of 16' or more
$T_c$ = Trench cover depth over pipe
W = 0.3 $B_c$ or 9", whichever is greater
E = Encasement
$L_B$ = Backfill length measured from toe to toe of the 2:1 slopes.




ELEVATION

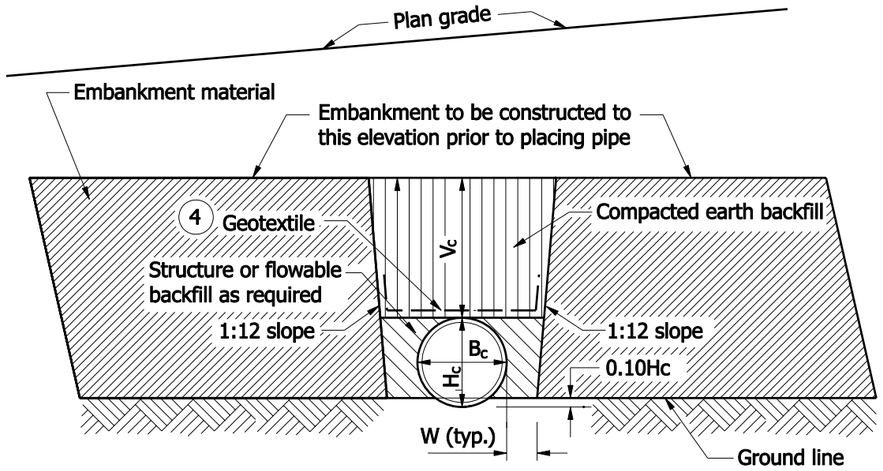
## NOTES :

1. Protective cover shall be constructed prior to running heavy equipment over installed pipes. The minimum covers are listed below:
   a.) 1.5' for $B_c \leq 18"$
   b.) 3' for $18" < B_c \leq 54"$
   c.) 4' for $B_c > 54"$
2. For backfill purposes, paved shoulders, curbs, and sidewalks are considered pavement. See Standard Drawing E 715-BKFL-10 for pavement limits when curbs, paved shoulders, or sidewalks are present.
3. Flowable or structure backfill shall be encased by compacted earth backfill. The minimum encasement shall be 2 ft. If necessary, the 2:1 slope between the flowable or structure backfill and the encasement shall be modified to maintain the minimum 2 ft encasement.
4. Geotextile required if coarse aggregate is used. Geotextile should extend 1 foot beyond each edge of the excavated trench or toe of slope.

INDIANA DEPARTMENT OF TRANSPORTATION

# PIPE BACKFILL METHOD 2
# CLASS II, IV, V AND VI DRIVES, TRENCH

11-16-06




SECTION D-D

## LEGEND

$H_c$ = Overall diameter or rise (typ.)

$B_c$ = Overall diameter or span

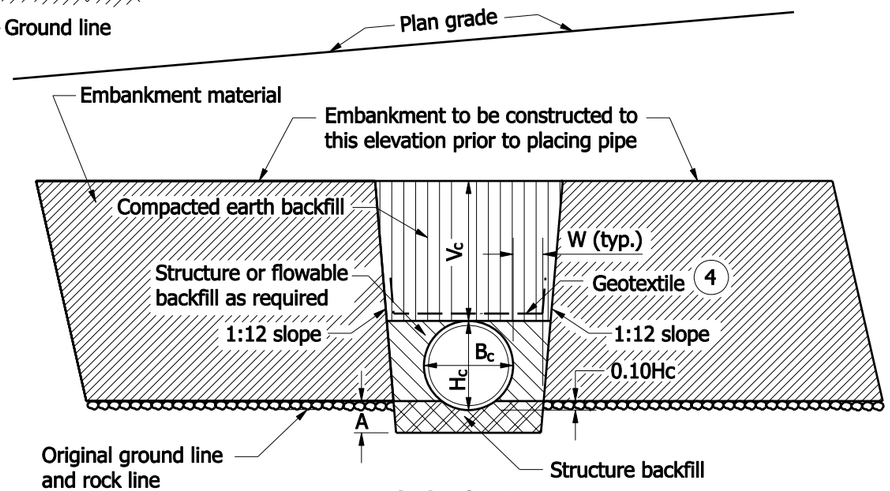
A = 8" min. for fill height less than 16'
= 12" min. for fill height of 16' or more

$V_c$ = 12" for $B_c \leq 18$"
18" for $B_c > 18$"

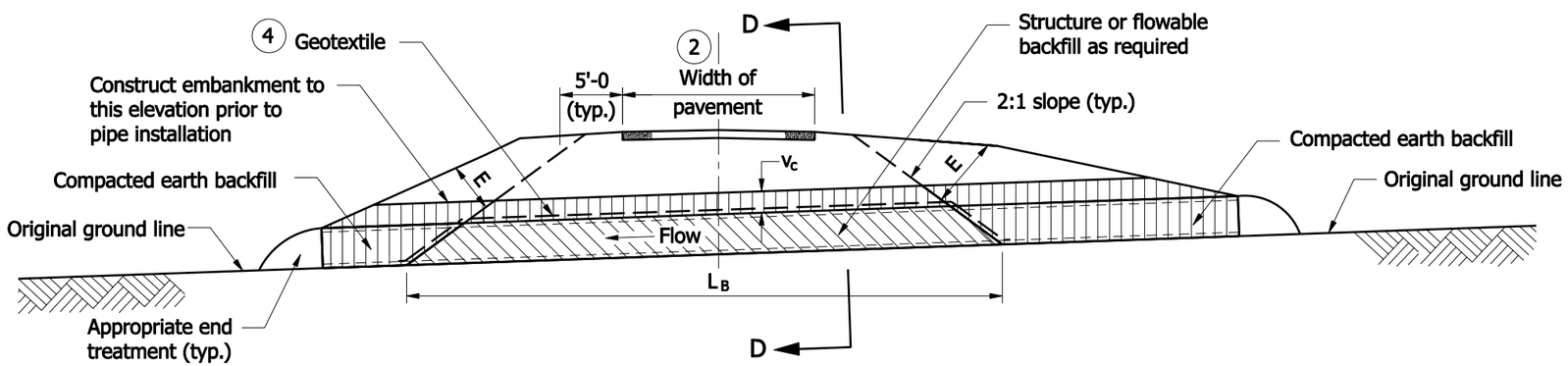
W = 0.3 $B_c$ or 9", whichever is greater

E = Encasement

$L_B$ = Backfill length measured from toe to toe of the 2:1 slopes.




SECTION D-D
ROCK FOUNDATION




ELEVATION

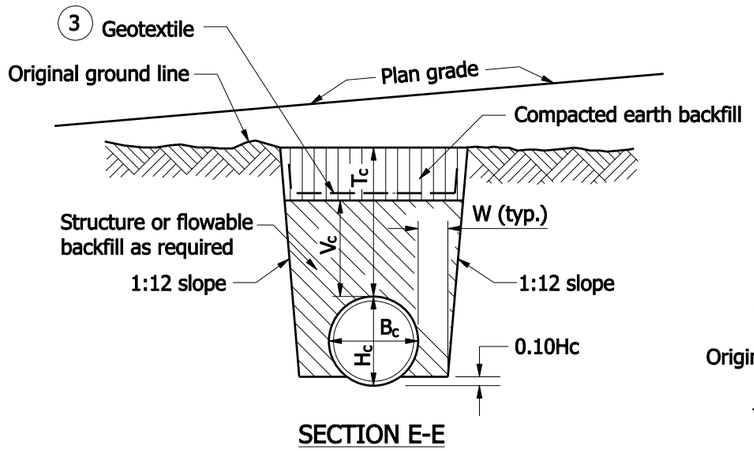
## NOTES :

1. Protective cover shall be constructed prior to running heavy equipment over installed pipes. The minimum covers are listed below:
   a.) 1.5' for $B_c \leq 18$"
   b.) 3' for 18" < $B_c \leq 54$"
   c.) 4' for $B_c > 54$"
2. For backfill purposes, paved shoulders, curbs, and sidewalks are considered pavement. See Standard Drawing E 715-BKFL-10 for pavement limits when curbs, paved shoulders, or sidewalks are present.
3. Flowable or structure backfill shall be encased by compacted earth backfill. The minimum encasement shall be 2 ft. If necessary, the 2:1 slope between the flowable or structure backfill and the encasement shall be modified to maintain the minimum 2 ft encasement.
4. Geotextile required if coarse aggregate is used. Geotextile should extend 1 foot beyond each edge of the excavated trench or toe of slope.

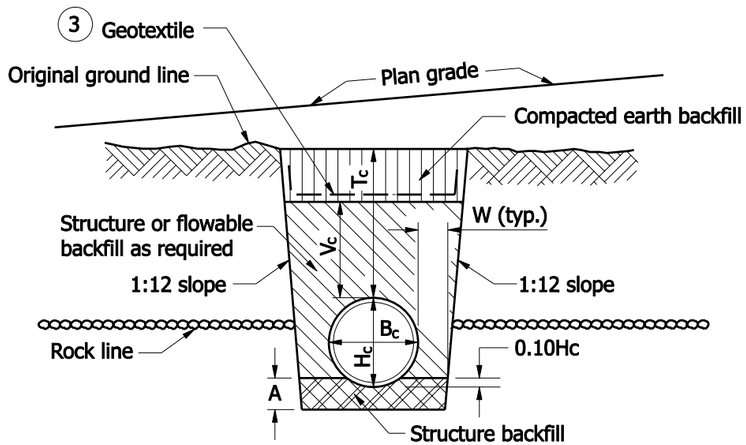
INDIANA DEPARTMENT OF TRANSPORTATION

# PIPE BACKFILL METHOD 2
# CLASS II, IV, V AND VI DRIVES, EMBANKMENT

11-16-06




SECTION E-E




SECTION E-E
ROCK FOUNDATION

## LEGEND

$H_c$ = Overall diameter or rise (typ.)

$B_c$ = Overall diameter or span

A = 8" min. for fill height less than 16'
= 12" min. for fill height of 16' or more

$V_c$ = 12" for $B_c \leq 18"$
18" for $B_c > 18"$

$T_c$ = Trench cover depth over pipe

W = 0.3 $B_c$ or 9", whichever is greater

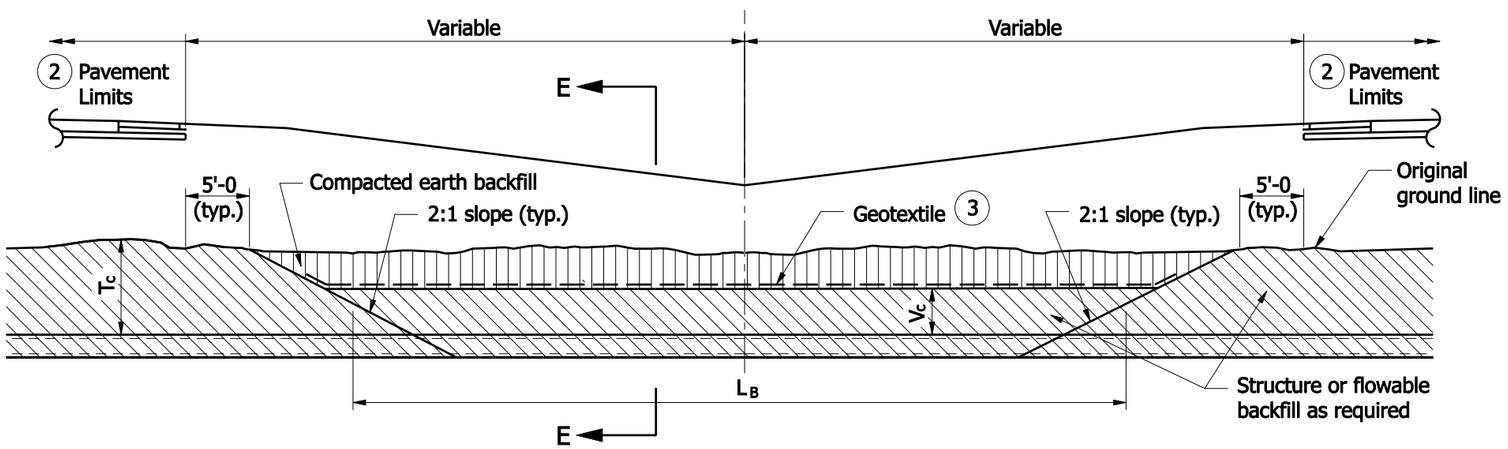
$L_B$ = Backfill length measured from toe to toe of the 2:1 slopes.

## NOTES :

1. Protective cover shall be constructed prior to running heavy equipment over installed pipes. The minimum covers are listed below:
   a.) 1.5' for $B_c \leq 18"$
   b.) 3' for $18" < B_c \leq 54"$
   c.) 4' for $B_c > 54"$

(2) For backfill purposes, paved shoulders, curbs, and sidewalks are considered pavement. See Standard Drawing E 715-BKFL-10 for pavement limits when curbs, paved shoulders, or sidewalks are present.

(3) Geotextile required if coarse aggregate is used. Geotextile should extend 1 foot beyond each edge of the excavated trench or toe of slope.




ELEVATION THRU MEDIAN STRIP

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 3
MEDIAN INSTALLATION, TRENCH

11-16-06

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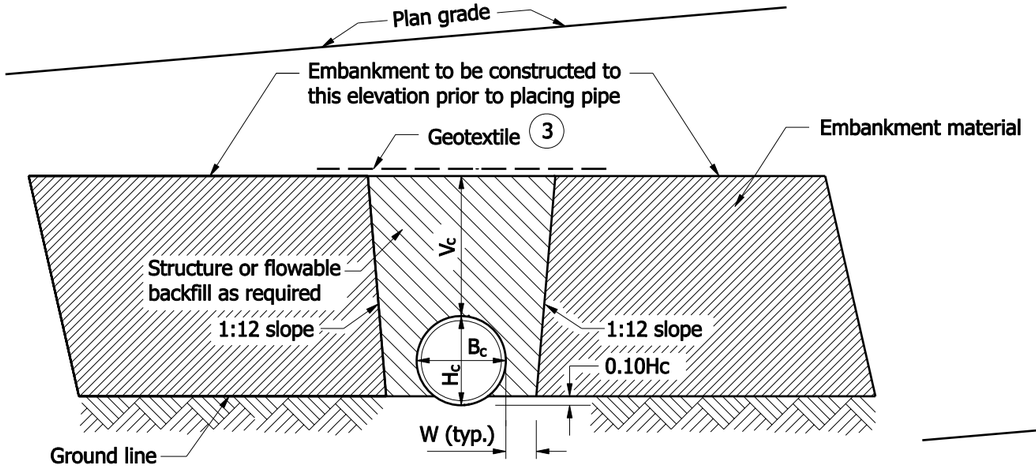


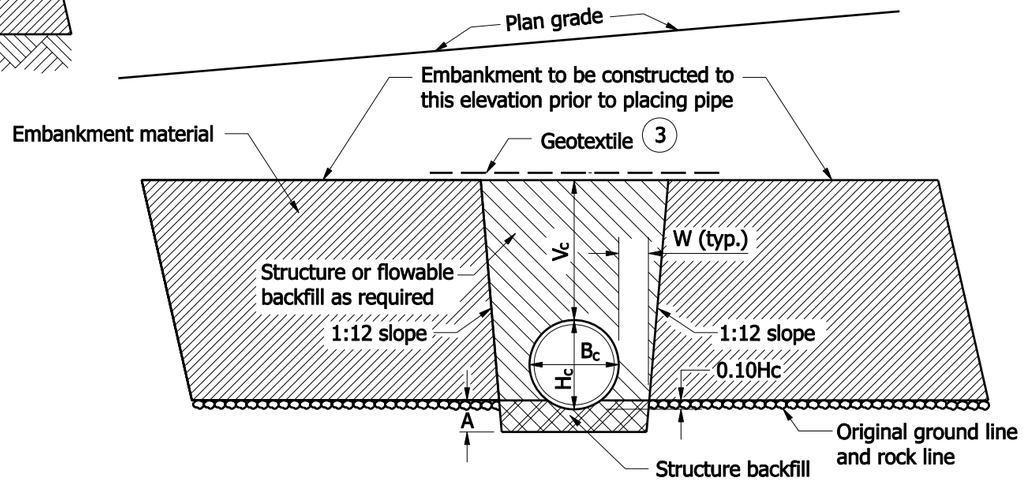

SECTION F-F

NOTES :

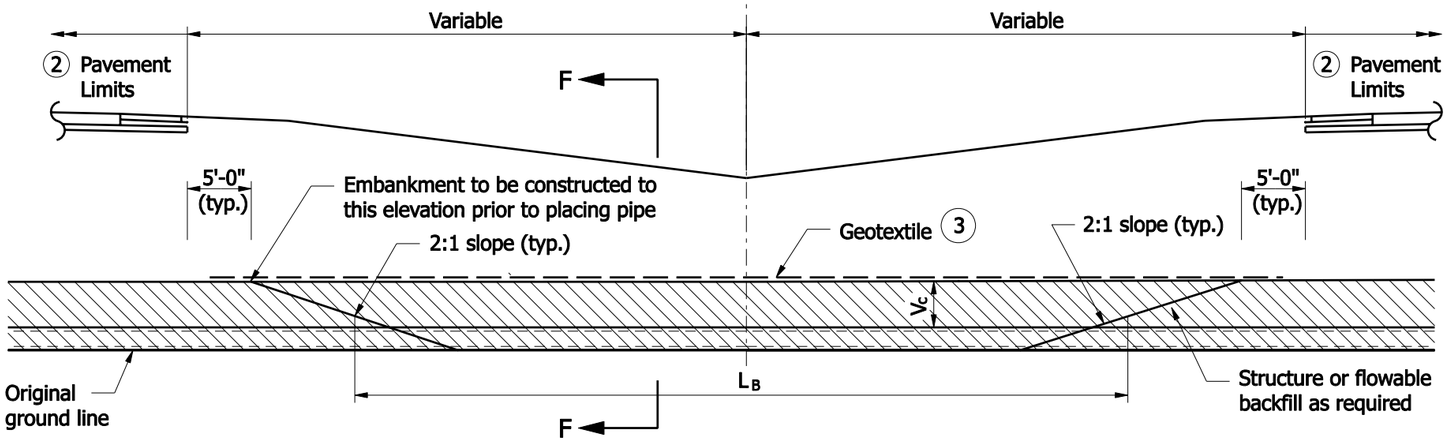
1. Protective cover shall be constructed prior to running heavy equipment over installed pipes. The minimum covers are listed below:
   a.) 1.5' for $B_c \leq 18"$
   b.) 3' for $18" < B_c \leq 54"$
   c.) 4' for $B_c > 54"$
2. For backfill purposes, paved shoulders, curbs, and sidewalks are considered pavement. See Standard Drawing E 715-BKFL-10 for pavement limits when curbs, paved shoulders, or sidewalks are present.
3. Geotextile required if coarse aggregate is used. Geotextile should extend 1 foot beyond each edge of the excavated trench or toe of slope.

LEGEND

$H_c$ = Overall diameter or rise (typ.)
$B_c$ = Overall diameter or span
A = 8" min. for fill height less than 16'
= 12" min. for fill height of 16' or more
$V_c$ = 12" for $B_c \leq 18"$
18" for $B_c > 18"$
W = 0.3 $B_c$ or 9", whichever is greater
$L_B$ = Backfill length measured from toe to toe of the 2:1 slopes.




SECTION F-F
ROCK FOUNDATION




ELEVATION THRU MEDIAN STRIP

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 1
MEDIAN INSTALLATION, EMBANKMENT

11-16-06

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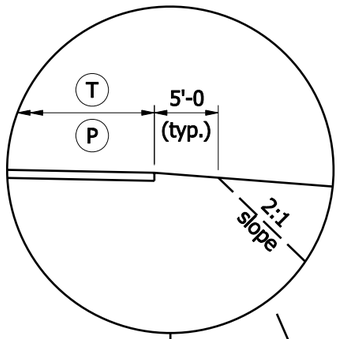
## LEGEND

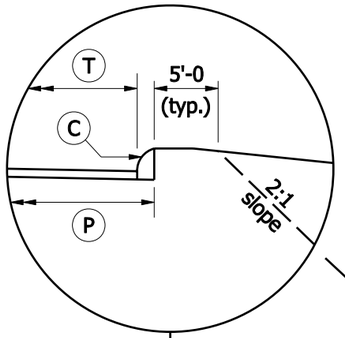
- (C) Curb
- (P) Pavement Limits *
- (S) Sidewalk
- (T) Travel Lane
- (U) Utility Strip
- (V) Paved Shoulder

* For backfill placement and computation

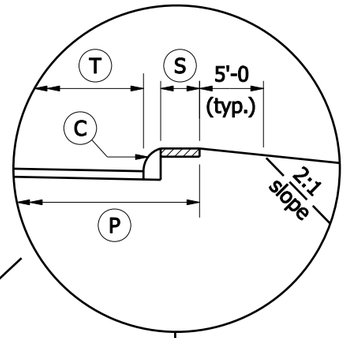
EDGE OF TRAVELWAY



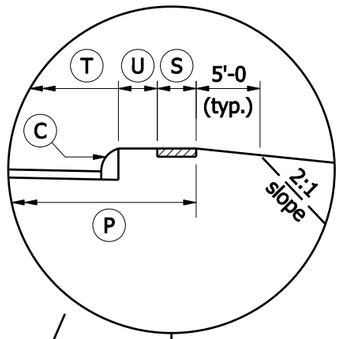

BACK OF CURB



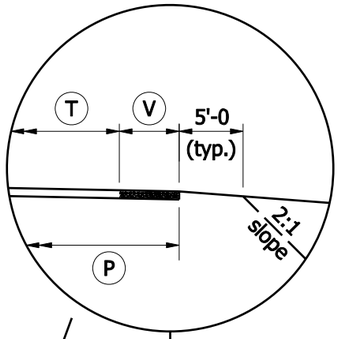

EDGE OF SIDWEWALK
ADJACENT TO CURB




EDGE OF SIDEWALK
ADJACENT TO UTILITY
STRIP




EDGE OF PAVED
SHOULDER

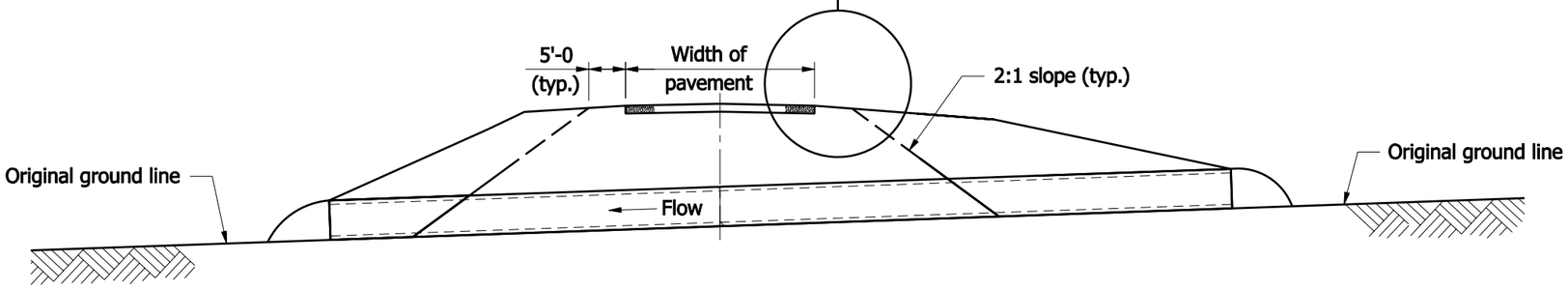



or

or

or

or




ELEVATION

INDIANA DEPARTMENT OF TRANSPORTATION

# PIPE BACKFILL
# LIMIT DETERMINATION

11-16-06